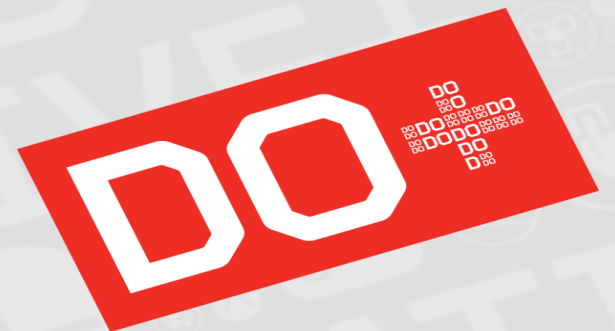




# LXCA Configuration Patterns

David Roberts | Configuration Patterns– 4/15/2015

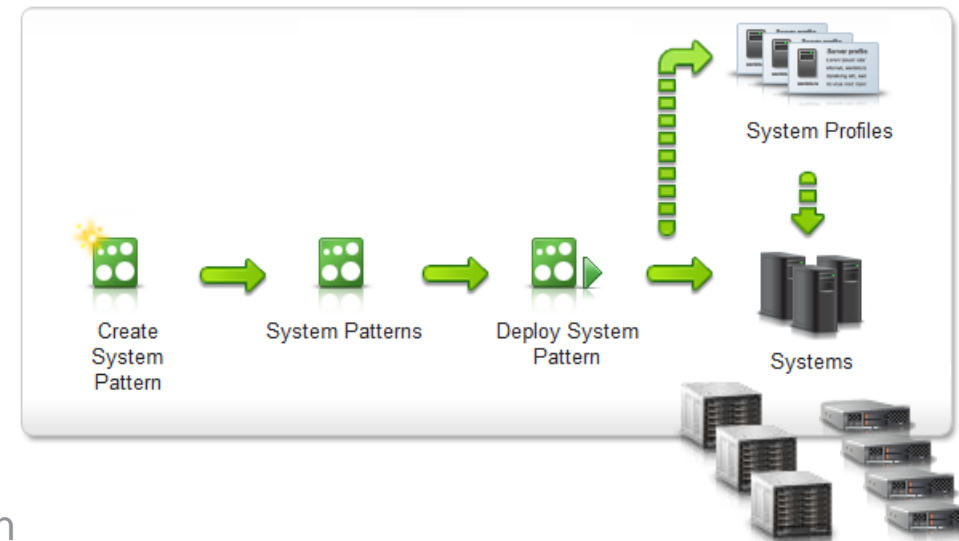


# Configuration Patterns Introduction

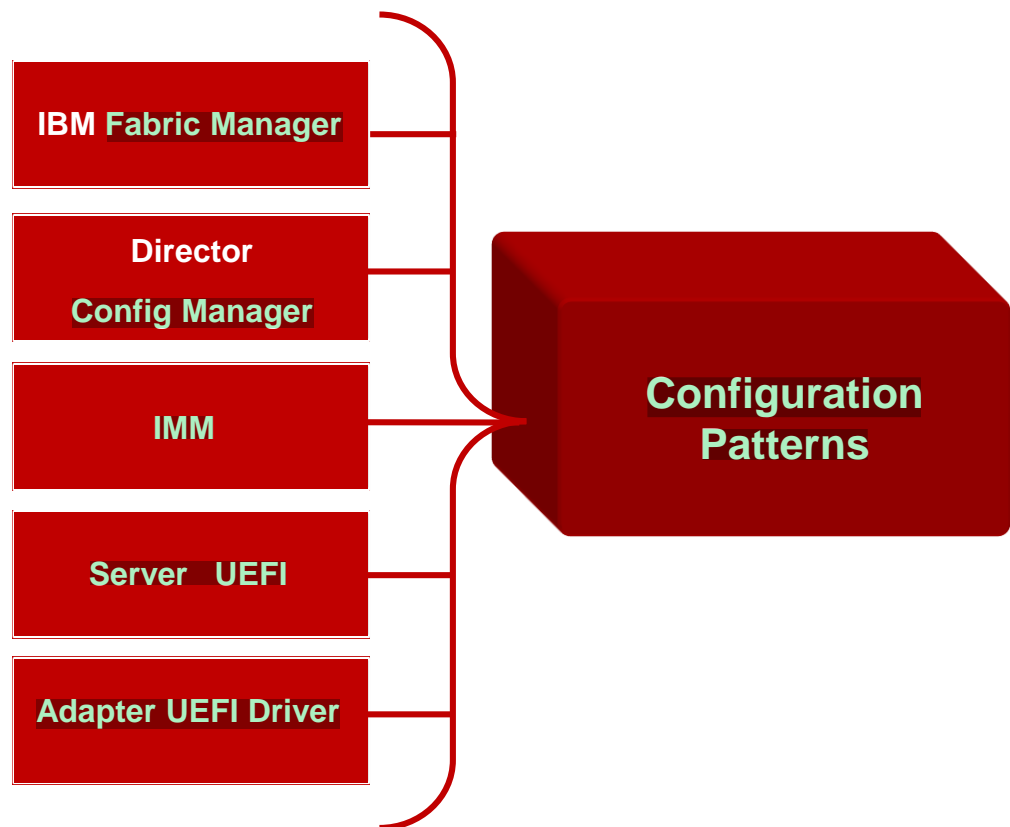
An integrated configuration management solution that simplifies the end-to-end task of provisioning System x hardware resources

## Client Value

- Reduce time spent on hardware rollout
  - Deploy pre-OS configuration to multiple devices from a single pattern
  - Integrate device configuration into single interface and workflow  
local storage, IMM, UEFI, I/O adapter and VNIC settings, virtual MAC/WWN addressing, SAN boot target
- Centralized pattern based management of configuration lifecycle
  - Consistent configuration baseline
  - Change configuration of multiple devices from a single interface
- Enable support for pre-configuration of ordered hardware, before physical acquisition
  - Pre-provision hardware by deploying placeholder configurations



# Configuration Patterns: Integrated Solution



- Consolidate operations into 1 unified solution that provides 1-to-many automation
- Guided approach to creating pools, patterns, and profiles
- Create reference patterns by capturing from existing hardware
- Tight binding of configurations to managed devices
- Propagation of pattern configuration changes
- Assistance with device/pattern differences

# Configuration Patterns: Differences from IBM FSM version

- **Chassis Pattern** support not available
  - Chassis component (Nodes, CMM, IOMs, etc) network configuration available Chassis Component Network Configuration UI
- **Compute node failover** support not available
  - Manual failover supported via profile **deactivate** / **reactivate**
- In order to clarify confusion related to server profile actions, **some terminology changes have been implemented**
  - Deploy profile is now called “**Activate Profile**”
  - Unassign profile is now called “**De-activate Profile**”
  - Profile status states are now ‘**Active**’ and ‘**Inactive**’
  - **Deploy Pattern** action remains **unchanged**

# Configuration Patterns: New Features

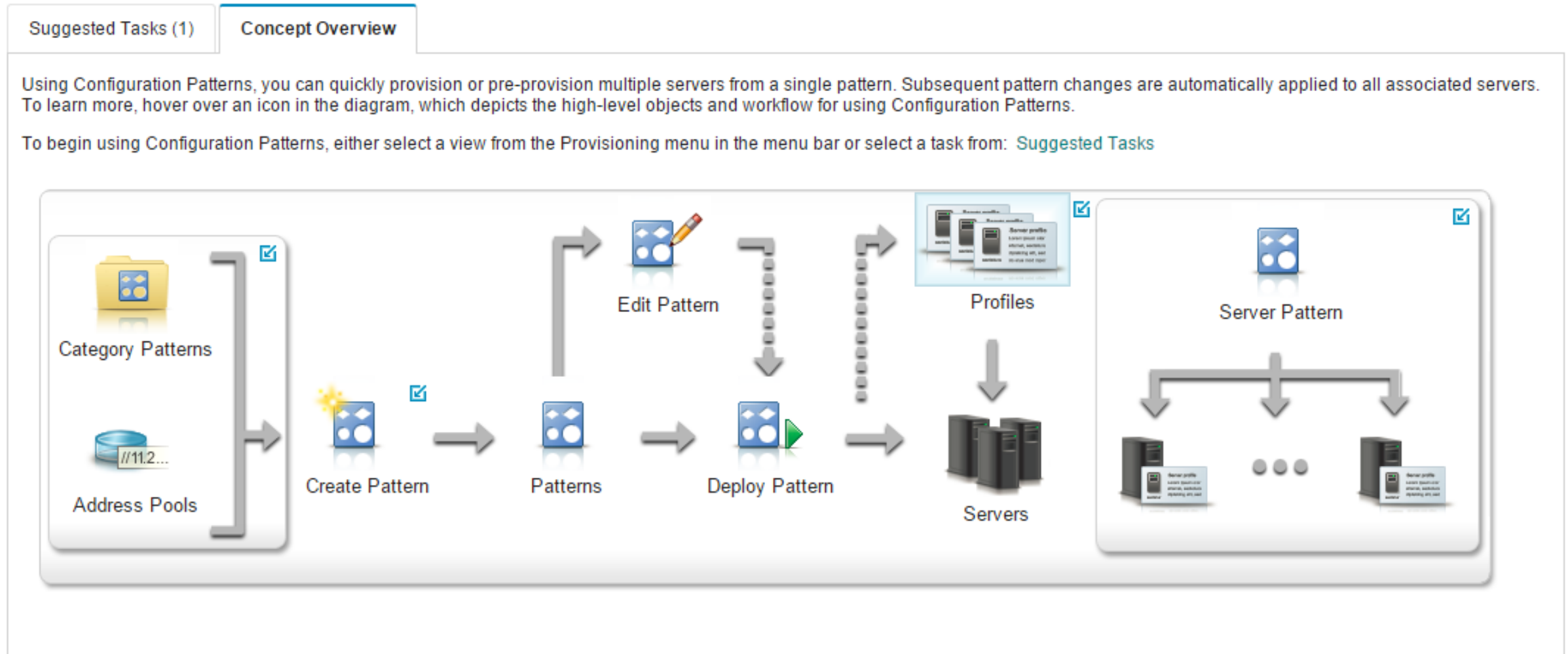
- User defined Ethernet & Fibre address pools
  - User supplied definition of address ranges
- Virtual address usage reporting
  - Expand support to include a view of the active ports and assigned addresses
- Pattern compatibility confirmation before deployment
  - Provide user with ability to review and confirm compatibility with servers before proceeding with deployment
- Parallel Deployment
  - Process queue in parallel, improving deploy processing time
- Pre-defined UEFI Patterns
  - Provide client with predefined UEFI patterns that match ATS recommendations for common workloads (Low Latency, Virtualization, etc)
- Import & Export of Patterns
  - REST API support for importing and exporting server pattern and associated category patterns

# Configuration Patterns: Hardware Enhancements

- Broaden compute **node configuration** extending support to rack based systems
  - Integrate rack servers with Flex node workflow, avoid dissimilar experiences
  - Support RAID, I/O Adapter, & IMM/UEFI Settings
  - Address virtualization not supported
- **Supported Servers:**
  - x3550 M5, x3650 M5, x3960 X6
- Provide support for **key chassis switch configuration**
  - Add key **switch configuration functions** for **Lenovo Flex chassis Ethernet switches**
  - Focused on functions that require coordination of ITE level and Chassis switch configuration
    - eg. vNIC/UFP & VLAN ID tags

# Configuration Patterns: Getting Started

- Introduction to concepts, including user objects and workflow



# Configuration Patterns: New Server Pattern Wizard

- User starts by selecting either **create** from **scratch** or from **existing server**

The screenshot shows the 'New Server Pattern Wizard' window. At the top, there are five tabs: 'General' (selected), 'Local Storage', 'I/O Adapters', 'Boot', and 'Firmware Settings'. Below the tabs, a message with a question mark icon says 'Before you begin this wizard'. Underneath is a dropdown menu labeled 'Select a starting point'. Two options are visible: 'Create a new pattern from an existing server' (with a server icon) and 'Create a new pattern from scratch' (with a blue square icon containing four white dots). At the bottom of the window, there are five buttons: 'Back', 'Next', 'Save', 'Save and Deploy', and 'Cancel'.



# Configuration Patterns: New Server Pattern Wizard Step 1

- Select server type (**Flex** vs **Rack**) and enter pattern name

New Server Pattern Wizard

General Local Storage I/O Adapters Boot Firmware Settings

? Before you begin this wizard

► Starting point: Create a new pattern from scratch.

Specify pattern form factor

Form Factor: ? Flex Compute Node ▼

Specify pattern name and description

\* Name: LXCA DST

Description (limit of 500 characters)

Back Next Save Save and Deploy Cancel

## Configuration Patterns: New Server Pattern Wizard Step 2


- Local Storage: Basic RAID Boot volume, keep existing, or disable for SAN boot


New Server Pattern Wizard


General Local Storage I/O Adapters Boot Firmware Settings

Define the storage configuration that is to be applied to target servers when this pattern is deployed.

Select local storage configuration

 Specify storage configuration

 Keep existing storage configuration on target

 Disable local disk

This option makes no changes to existing storage configuration on target servers when this pattern is deployed.

Back Next Save Save and Deploy Cancel

# Configuration Patterns: New Server Pattern Wizard Step 3

- Define IO Adapter configuration

### New Server Pattern Wizard

General

Local Storage

I/O Adapters

Boot

Firmware Settings

? If desired, you can modify adapter addressing and define additional adapters to match the hardware that you expect to configure with this pattern.

I/O adapter addressing: ? **Burned In** Virtual

| Non-Scalable Compute Node  ☐ Advanced Settings |   | All Actions

<input type="checkbox"/> Location	Type	PCI Slot	Configuration Pattern	I/O Addressing	Description
<input type="checkbox"/> <span></span> Compute Node					
<input type="checkbox"/> Add I/O Adapter					No adapter defined

Back

Next

Save

Save and Deploy

Cancel

# Configuration Patterns: IO Adapter

- Select **IO Adapters** and **define settings** via **Port Pattern**



Add I/O Adapter 1 or LOM

---

PCI Slot:  ▼

▶ Selected Adapter: Embedded 10Gb Virtual Fabric Ethernet Controller (LOM)

Select initial patterns. (?)

Initial port pattern: (?)  ▼  

# Configuration Patterns: Port Pattern

## ■ Configure Ethernet & Fibre Port Settings

New Port Pattern

---

Specify name and description

\* Name:


Description:

Specify the adapter and port compatibility. ?

Target adapter type:

Target port operational mode:

Target port protocols:

Port extended settings pattern: ?  

☐ Apply corresponding settings to the chassis switch internal ports where applicable

## ■ Port Virtualization Settings

- vNIC, UFP Mode

## ■ Storage Protocols

- FCoE, iSCSI enablement

## ■ Extended Settings

- Learned adapter settings for advanced Ethernet and Fibre Channel settings

# Configuration Patterns: Port Pattern, Chassis Ethernet Switch Support

- New in LXCA, Support for configuring chassis Ethernet switch internal port settings

New Port Pattern

☒ Apply corresponding settings to the chassis switch internal ports where applicable

*i* The following switch related settings can only apply to 4 types of switches. [Show Details](#)

**UFP Function Settings**    Advanced Settings

Function	Enable	Mode	*Bandwidth (%)	VLAN Settings
1 <sup>st</sup> Function	<input checked="" type="checkbox"/>	Trunk	25 - 100	Native VLAN 101 VLANs
2 <sup>nd</sup> Function	<input checked="" type="checkbox"/>	Trunk	25 - 100	Native VLAN 102 VLANs
3 <sup>rd</sup> Function	<input checked="" type="checkbox"/>	Trunk	25 - 100	Native VLAN 103 VLANs
4 <sup>th</sup> Function	<input checked="" type="checkbox"/>	Trunk	25 - 100	Native VLAN 104 VLANs

Create Cancel

- Supported on Lenovo branded chassis switches:
  - EN4093R, CN4093, SI4093 & SI4091
  - Integrates configuration that requires coordination node and chassis switch configuration
  - Including, UFP Port Provisioning, VLAN Membership, flow control and failover

# Configuration Patterns: IO Adapter View

- Adapter, port patterns and enabled ports displayed

New Server Pattern Wizard

General Local Storage **I/O Adapters** Boot Firmware Settings

? If desired, you can modify adapter addressing and define additional adapters to match the hardware that you expect to configure with this pattern.

I/O adapter addressing: ? **Burned In** Virtual

Non-Scalable Compute Node Advanced Settings All Actions

Location	Type	PCI Slot	Configuration Pattern	I/O Addressing	Description
[-] Compute Node					
[-] LOM Fabric Connector	Virtual Fabric	1			Embedded 10Gb Virtual Fabric Ethernet Controller (LOM)
[-] Port 1	Virtual Fabric		UFP Mode	Burned-in Addresses	Physical Virtual Fabric port
Function 1 — NIC				Burned-in Addresses	Virtual Ethernet port
Function 2 — NIC				Burned-in Addresses	Virtual Ethernet port
Function 3 — NIC				Burned-in Addresses	Virtual Ethernet port
Function 4 — NIC				Burned-in Addresses	Virtual Ethernet port
[-] Port 2	Virtual Fabric		UFP Mode	Burned-in Addresses	Physical Virtual Fabric port
+ Add I/O Adapter					No adapter defined

Back Next Save Save and Deploy Cancel

# Configuration Patterns: Address Virtualization

## ■ Enable Virtualization of IO Hardware Addresses

Edit Virtual Addressing

Ethernet (MAC) virtual addressing **Enabled**

Ethernet (MAC) address pool:  
Lenovo MAC Addresses ▼

Address range:  
Default Lenovo Range 1 ▼ (576 out of 7281 addresses are allocated)

Fibre Channel (WWN) virtual addressing **Enabled**

Fibre Channel (WWN) address pool:  
Lenovo WWN Addresses ▼

Address range:  
Default Lenovo Range 1 ▼ (288 out of 466032 addresses are allocated)

Save Cancel

## ■ Virtual addressing

- Provides ability to re-assign or “virtualize” IO Adapter Ethernet and Fibre port addresses, overriding burned in addresses

## ■ Enables SAN Boot manual failover

- By assigning addresses to a profile instead of burned in, profiles can be deactivated and activated to a new node upon node failure

## ■ New in LXCA, support for defining custom address pools

- Users can now define custom addresses pool sizes & starting addresses



# Configuration Patterns: New Server Pattern Wizard Step 4

## ■ Boot order

The screenshot shows the 'New Server Pattern Wizard' at Step 4, 'Boot'. The wizard has five tabs: 'General', 'Local Storage', 'I/O Adapters', 'Boot' (selected), and 'Firmware Settings'. Below the tabs, a message states: 'This pattern can be used to configure the boot order for Legacy Only boot environments and SAN boot targets for UEFI or Legacy environments.' The 'System boot mode' section contains four radio buttons: 'UEFI Only Boot', 'UEFI First, Then Legacy', 'Legacy Only Boot', and 'Keep existing boot mode' (which is selected). Below this, there are three sub-tabs for boot order: 'Primary Boot Order' (selected), 'Wake on LAN (WoL) Boot Order', and 'SAN Boot'. A blue information box with an 'i' icon states: 'Boot order can only be configured if the Legacy Only Boot option is selected as the system boot mode.' with a 'Show Details' link. At the bottom, there are five buttons: 'Back', 'Next' (highlighted with a dashed border), 'Save', 'Save and Deploy', and 'Cancel'.

- Most useful for legacy boot
  - UEFI Oses typically modify the boot order as part of install
  - Defining boot order most useful for legacy boot installations

# Configuration Patterns: New Server Pattern Wizard Step 5

## ■ Firmware Settings

New Server Pattern Wizard

General Local Storage I/O Adapters Boot **Firmware Settings**

**Integrated Management Module (IMM) and Server Firmware Settings (UEFI)**

Select existing or create new category patterns as desired to include in this server pattern.

Category	Pattern		
System Information: ?	— No Pattern Selected —		
Management Interface: ?	— No Pattern Defined —		
Device And IO Ports: ?	— No Pattern Defined —		
Extended IMM: ?	— No Pattern Defined —		
Extended UEFI: ?	— No Pattern Selected —		

[Learn more about Extended Patterns](#)

M5 High Performance  
M5 Low Latency  
M5 Virtualization  
x240 High Performance  
x240 Low Latency  
x240 Standard Workload  
x240 Transactional Workload  
x240 Virtualization  
x6 High Performance

Back Next Save Save and Deploy Cancel

## ■ Patterns for modifying:

- **System info**, including location & device name
- **Management Interface**, IMM IP, Hostname
- **Device & IO Ports**, Console redirection & SOL
- **Extended IMM & UEFI Settings**

# Configuration Patterns: Extended UEFI Patterns

- New in LXCA, Pre-defined UEFI Patterns

Edit Extended UEFI Pattern - M5 High Performance

Turbo Mode	Enabled
Processor Performance States	Enabled
C-States	Disabled
C1 Enhanced Mode	Disabled
Hyper-Threading	Enabled
Execute Disable Bit	Enabled
Trusted Execution Technology	Disabled
Intel Virtualization Technology	Enabled
Hardware Prefetcher	Enabled
Adjacent Cache Prefetch	Enabled
DCU Streamer Prefetcher	Enabled
DCU IP Prefetcher	Enabled
DCA	Enabled
Energy Efficient Turbo	Disabled

Include / Exclude Settings   Save   Save As...   Cancel

- Pre-defined, ATS provided best practices, optimized UEFI settings for typical workloads
  - Virtualization (hypervisors)
  - High Performance
  - Low Latency
  - Transactional workloads

# Configuration Patterns: Deploy Server Compatibility Verification

## Deploy Server Pattern - LXCA DST

Deploy the server pattern to one or more individual servers or groups of servers (for example, a chassis). During deployment, one server profile is created for each individual server.

\* Pattern To Deploy: LXCA DST

\* Activation ?

- ☒ Full — Activate all settings and restart the server now.  
☐ Partial — Activate IMM settings but do not restart the server. UEFI and server settings will be active after the next restart.  
☐ Deferred — Generate a profile with the settings for review, but do not activate settings on the server.

Choose one or more servers to which to deploy the selected pattern.

☐ Show Empty Bays

Any Deploy Status

Filter

<input type="checkbox"/>	Name	Rack Name/Unit	Chassis/Bay	Deploy Status
<input checked="" type="checkbox"/>	Lenovo x440	Unassigned / Unassigned	SN#Y030BG21E01C, Bay 1,2	✓ Ready
<input type="checkbox"/>	IBM x880 (Pri)	Unassigned / Unassigned	SN#Y030BG21E01C, Bay 3,4,5,6	⚠ Not Supported <a href="#">More Details</a>
<input type="checkbox"/>	Lenovo x240 M5	Unassigned / Unassigned	SN#Y030BG21E01C, Bay 7	⚠ Not Supported <a href="#">More Details</a>
<input type="checkbox"/>	Lenovo x240	Unassigned / Unassigned	SN#Y030BG21E01C, Bay 8	⚠ Not Supported <a href="#">More Details</a>


Deploy

Cancel

- Ensures server has minimum required firmware levels
- Server is available and not locked by another provisioning activity
- Validates selected Adapter Port Pattern is compatible with server

# Configuration Patterns: Job Status

## ■ Monitor deploy process via Jobs UI

 Deployment request was submitted.

Job "Server Profile activation: Apr 13, 2015" has been created and started successfully. Changes are being propagated to the following servers or bays: Lenovo x440

You can monitor job progress from the Jobs pod in the banner above.

You can view the profile creation progress from the Server Profiles link that is located under the Provisioning menu in the menu bar. Profiles will not show up in the Server Profiles table until the profile has been created.






Jump to Jobs page

Jump to Profiles page


Return to Patterns page

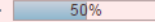
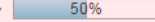
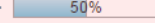


Jobs

Jobs are longer running tasks performed against one or more target systems. After selecting a job, you can choose to cancel it, delete it, or obtain details.



All Actions 

Show: 

<input type="checkbox"/> Job	Status	Start	Complete	Targets
<input type="checkbox"/> Profile activation for server Lenovo	 50%	April 13, 2015 at 08:04:08		
<input type="checkbox"/> Server Profile activation: Apr 13, 2	 50%	April 13, 2015 at 08:03:50		
<input type="checkbox"/> Deploy Server Settings	 50%			SN#Y0
<input type="checkbox"/> Manage job for 97c28df7541b465	 Complete	April 13, 2015 at 07:53:19	April 13, 2015 at 07:59:01	SN#Y030BG21E01C Management USERID
<input type="checkbox"/> Unmanage job for F44E92339683	 Complete	April 13, 2015 at 07:49:51	April 13, 2015 at 07:49:52	Not Available Management USERID

Summary:


Name:

Server Profile activation: Apr 13, 2015

Time Started:

April 13, 2015 at 08:29:07

Overall Status:

 Complete

Target:

Created By:

USERID

Target Results: With Errors: 0 Running: 0 Completed: 1

Target	Message
SN#Y030BG21E01C: Lenovo x440: Bay 1-2	Deploy Server Settings

Close

# Configuration Patterns: Troubleshooting

▼ Summary:

Name:

Server Profile activation: Apr 13, 2015

Time Started:

April 13, 2015 at 08:03:50

Overall Status:

✖ Stopped With Error

Target:

Created By:

USERID


▼ Target Results: With Errors: 1 Running: 0 Completed: 0


Target	Message
SN#Y030BG21E01C: Lenovo x440: Bay 1-2	Deploy Server Settings


▼ Log


Close


- Most failures are captured and logged via the job log
  - Errors communicating with server
  - Failure to restart server
  - Incompatible settings
- Detailed failure data captured via FFDC captures
  - Capture ID: 5101
  - Includes logs, & diagnostic data
  - Archive of persisted user data, including created patterns, profiles & pools

 Download All Service Data

 Download logs only







All actions ▼

Filter

	Date and Time ▲	File	Description
<input type="radio"/>	Apr 13, 2015, 8:04:08 AM	INFO_5 (ffdcCapture_11001-5.zip)	com.lenovo.lxca.job.ActionJob DumpID 11001
<input type="radio"/>	Apr 13, 2015, 8:07:48 AM	INFO_6 (ffdcCapture_11001-6.zip)	com.lenovo.lxca.job.ActionJob DumpID 11001
<input checked="" type="radio"/>	Apr 13, 2015, 8:10:21 AM	FFDC_3 (ffdcCapture_5101-3.zip)	com.lenovo.lxca.server.servlets.ffdc.FFDCDumpArchiveServlet DumpID 5101